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REVISED FEED FORMULAS FOR CHICKENS[1]

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POULTRYMEN FACE NEW FEED PROBLEMS as a result of changes in the availability of certain feedstuffs.

Many feeds formerly used are now scarce, unavailable, or too costly to feed to chickens. This publication deals with new knowledge of old materials that are still abundant and with new materials to replace the scarce feeds.

Profits on poultry operations depend in no small measure on how well the feeding problem is solved. How and what to feed are questions that must be answered largely on the basis of the local situation. due to restricted supplies of some feedstuffs.

Under present conditions it is sometimes impossible or impracticable to use the feed formulas recommended by the Department of Agriculture in Farmers' Bulletin 1841, The Feeding of Chickens, and in other publications of the Department. The formulas in the tables in this leaflet are therefore suggested.

In general, the starting and breeding mashes containing fish meal, dried skim milk, or buttermilk are superior to those not containing these ingredients, but there are exceptions to this statement depending on variations in quality of individual ingredients. Less variation would be expected in the results obtained with the different growing and laying mashes.

Formulas of suggested substitutes for fish meal, meat scrap, dried skim milk or dried buttermilk, and alfalfa meal are also given. The substitutes can be used in all-mash starting or starting-and-growing diets containing at least 21 percent of total protein and in all-mash laying diets containing at least 16 percent of total protein.

[1] This publication is a revision of and supersedes AW1-48.
[2] Authors have resigned. Revision by H. R. Bird.

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SOME POINTS TO REMEMBER

In using the new formulas points to be remembered are:

Only properly cooked or heat-treated soybean meal should be used in mixtures containing large quantities of this feedstuff.

Alfalfa meal containing not less than 90,000 International units of vitamin A activity per pound is preferable. An alfalfa meal of lower potency may be used, however, if other ingredients in the mixture supply enough additional vitamin A activity.

Other fermentation products and byproducts may be used in place of the dried distillers' solubles as a source of riboflavin and of the other vitamins of the B–G complex. The riboflavin content of these other products ranges from 5,500 to 112,000 micrograms per pound. In calculating the amount of substitute product to use the riboflavin content of the dried distillers' solubles may be estimated at 9,000 micrograms per pound. In mashes containing alfalfa meal and fish meal, synthetic riboflavin may be used instead of riboflavin from a natural source.

The suggested feed mixtures in tables 1 to 7 contain all the calcium chickens require. Additional calcium in the form of oystershell or limestone grit is therefore unnecessary and undesirable.

Use of insoluble grit with these mixtures is not objectionable. It is worth while to provide a small quantity of such material at regular intervals where chickens are confined or, for some other reason, are unable to pick up small stones and pebbles from their range.

MINERALS AND VITAMINS

The feed formulas recommended call for manganized salt. This will aid in preventing perosis. It may be prepared by mixing 100 pounds of fine, free-flowing dairy or table salt and 2.5 pounds of finely puverized technical anhydrous manganous sulfate, available at feed supply stores and some drug stores.

The vitamin A and D feeding oil should contain 400 A. O. A. C. chick units [3] of vitamin D and 2,000 International units of vitamin A per gram, or about 181,500 of the chick units of vitamin D and 907,500 units of vitamin A per pound. The vitamin A content is not so important if high-grade alfalfa meal is included in the feed mixture.

If vitamin A and D feeding oil is not available, a quantity of D-activated animal sterol that supplies the same quantity of vitamin D may be used, provided the other ingredients of the diet supply sufficient vitamin A.

Make the maximum use of sunshine and good grass range. Sunshine is the cheapest source of vitamin D, and fresh green feed, especially short young grass, is an excellent source of all the other known vitamins.

[3] This is the official unit of the Association of Official Agricultural Chemists.

TABLE 1.—*Suggested all-mash chick-starting diets*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	20.0		42.0	32.0		42.0
Ground wheat	32.0	10.0		10.0	52.0	
Ground barley, milo, or hegari		42.0				
Ground oats or wheat middlings			10.0	10.0		10.0
Soybean meal	21.0	21.0	24.0	23.0	21.0	23.0
Cottonseed meal, peanut meal, corn gluten meal, hempseed meal, sesame meal, or soybean meal	10.0	10.0	10.0	10.0	10.0	10.0
Fish meal			2.0			2.0
Meat scrap		2.5			3.0	
Dried skim milk or dried buttermilk	5.0			4.0		
Dried whey		5.0	5.0	4.7		
Alfalfa meal	7.7	6.0			8.0	5.7
Dried distillers' solubles			2.7	2.0	2.6	3.0
Steamed bonemeal	2.0	1.1	2.0	2.0	1.0	2.0
Ground limestone or oystershell	1.2	1.3	1.2	1.2	1.3	1.2
Manganized salt	1.0	1.0	1.0	1.0	1.0	1.0
Vitamin A and D feeding oil	.1	.1	.1	.1	.1	.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 2.—*Suggested all-mash chick-growing diets*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	34.0		54.0	44.0	10.0	54.0
Ground wheat	30.0	10.0		10.0	54.0	
Ground barley, milo, or hegari		54.0				
Ground oats or wheat middlings			10.0	10.0		10.0
Soybean meal	15.0	15.0	19.0	19.0	15.0	15.0
Cottonseed meal, peanut meal, corn gluten meal, hempseed meal, sesame meal, or soybean meal	5.0	5.0	5.0	5.0	5.0	5.0
Fish meal			1.0			1.7
Meat scrap		1.0			2.0	
Dried skim milk or dried buttermilk	3.0			1.8		
Dried whey		6.0	4.0	4.1		
Alfalfa meal	8.0	6.0			8.0	8.0
Dried distillers' solubles	2.0		3.9	3.0	3.0	3.3
Steamed bonemeal	1.0	1.0	1.0	1.0	1.0	1.0
Ground limestone or oystershell	1.0	1.0	1.0	1.0	1.0	1.0
Manganized salt	1.0	1.0	1.0	1.0	1.0	1.0
Vitamin A and D feeding oil	(1)	(1)	.1	.1	(1)	(1)
Total	100.0	100.0	100.0	100.0	100.0	100.0

[1] If the chickens do not have access to direct sunlight, add 0.1 percent of vitamin A and D feeding oil.

TABLE 3.—*Suggested chick growing mashes with which an equal weight of grain is to be fed*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	20.0		35.0	25.0		35.0
Ground wheat	25.0	10.0		10.0	45.0	
Ground barley, milo, or hegari		35.0				
Ground oats or wheat middlings			10.0	10.0		10.0
Soybean meal	20.0	20.0	20.0	20.0	20.0	20.0
Cottonseed meal, peanut meal, corn gluten meal, hempseed meal, sesame meal, or soybean meal	13.0	13.0	14.0	15.0	12.0	13.0
Fish meal			2.0			2.0
Meat scrap		3.0			4.0	
Dried skim milk or dried buttermilk	6.5			4.0		
Dried whey		6.5	6.5	5.3		
Alfalfa meal	10.0	7.0			8.0	8.0
Dried distillers' solubles			7.8	5.0	6.5	6.5
Steamed bonemeal	2.0	2.0	1.0	2.0	1.0	2.0
Ground limestone or oystershell	2.0	2.0	2.0	2.0	2.0	2.0
Manganized salt	1.5	1.5	1.5	1.5	1.5	1.5
Vitamin A and D feeding oil	(1)	(1)	.2	.2	(1)	(1)
Total	100.0	100.0	100.0	100.0	100.0	100.0

[1] If the chickens do not have access to direct sunlight, add 0.2 percent of vitamin A and D feeding oil.

TABLE 4.—*Suggested all-mash laying diets*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	42.5	20.0	43.5			
Ground wheat		27.5		42.5	36.5	
Ground oats	10.0	10.0	10.0	20.0		
Ground barley					30.0	28.0
Ground milo or hegari						40.0
Wheat middlings, standard	15.0	15.0	15.0			
Wheat bran	5.0		5.0	10.0		
Soybean meal	12.0	9.0	15.0	12.0	12.0	12.5
Corn gluten meal or soybean meal				3.0	4.0	
Peanut, sesame, hempseed or soybean meal	3.0	5.0			3.0	5.0
Meat scrap	2.0	2.0	1.0	1.0	2.0	2.0
Dried skim milk			1.5			
Dried whey				4.5		
Alfalfa meal	4.0	5.0			6.0	6.0
Dried distillers' solubles			2.0			
Ground limestone	3.0	3.0	3.5	3.5	2.5	2.5
Steamed bonemeal	2.5	2.5	2.5	2.5	3.0	3.0
Manganized salt	.8	.8	.78	.78	.8	.8
Vitamin A and D feeding oil	.2	.2	.22	.22	.2	.2
Total	100.0	100.0	100.0	100.0	10.0	100.0

TABLE 5.—*Suggested laying mashes with which an equal weight of grain is to be fed*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	25.0		30.0			
Ground wheat		25.0		23.5	12.0	
Ground oats	10.0	10.0	10.0	20.0		
Ground barley					30.0	13.0
Ground milo or hegari						30.0
Wheat middlings, standard	10.0					
Wheat bran		10.0	10.0			
Soybean meal	24.0	20.0	26.0	27.5	20.0	22.5
Corn gluten meal or soybean meal				6.0	7.5	
Peanut, sesame, hempseed or soybean meal	5.0	8.0			4.0	7.5
Meat scrap	4.0	4.0	2.0	2.0	3.5	4.0
Dried skim milk			3.0			
Dried whey				9.0	2.0	
Alfalfa meal	9.0	10.0			10.0	10.0
Dried distillers' solubles	2.0	2.0	7.0			2.0
Ground limestone	5.5	6.0	6.0	6.5	5.5	5.5
Steamed bonemeal	3.5	3.0	4.0	3.5	3.5	3.5
Manganized salt	1.6	1.6	1.56	1.56	1.6	1.6
Vitamin A and D feeding oil	.4	.4	.44	.44	.4	.4
Total	100.0	100.0	100.00	100.00	100.0	100.0

TABLE 6.—*Suggested all-mash breeding diets*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	38.0	20.0	39.5			
Ground wheat		28.5		39.5	37.5	
Ground oats	10.0	10.0	10.0	20.0		
Ground barley					30.0	27.5
Ground milo or hegari						40.0
Wheat middlings, standard	15.0	15.0	15.0			
Wheat bran	10.0		10.0	12.0		
Soybean meal	7.5	5.0	9.0	9.0	12.0	12.0
Corn gluten meal or soybean meal				3.0	3.0	
Peanut, sesame, hempseed or soybean meal	2.5	4.0				3.0
Fishmeal		1.5		2.0	2.5	1.5
Dried skim milk	2.5		4.0			3.0
Meat scrap	2.0	1.5	1.5			
Dried whey		3.0		7.5	2.5	
Alfalfa meal	4.0	5.0			6.0	6.0
Dried distillers' solubles	2.0		4.0			
Ground limestone	3.0	3.0	3.5	3.5	2.5	2.5
Steamed bonemeal	2.5	2.5	2.5	2.5	3.0	3.5
Manganized salt	.7	.7	.67	.67	.7	.7
Vitamin A and D feeding oil	.3	.3	.33	.33	.3	.3
Total	100.0	100.0	100.00	100.00	100.0	100.0

TABLE 7.—*Suggested breeding mashes with which an equal weight of grain is to be fed*

Ingredient	Diet No.					
	1	2	3	4	5	6
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Ground yellow corn	25.0		25.0			
Ground wheat		25.0		20.0	7.5	
Ground oats	10.0	10.0	10.0	10.0		
Ground barley					30.0	12.5
Ground milo or hegari						30.0
Wheat middlings, standard	10.0					
Wheat bran		10.0	10.0	12.5		
Soybean meal	20.0	12.5	22.5	20.0	20.0	25.0
Corn gluten meal or soybean meal				6.0	7.5	
Peanut, sesame, hempseed or soybean meal		9.0				
Fish meal		3.0		4.0	5.0	2.5
Meat scrap	5.0	3.0	3.0			
Dried skim milk	5.0		8.0			8.0
Dried whey		6.0		15.0	8.0	
Alfalfa meal	9.0	10.0			10.0	10.0
Dried distillers' solubles	4.5		9.0			
Ground limestone	5.5	6.0	6.5	6.5	6.0	6.0
Steamed bonemeal	4.0	3.5	4.0	4.0	4.0	4.0
Manganized salt	1.4	1.4	1.33	1.33	1.4	1.4
Vitamin A and D feeding oil	.6	.6	.67	.67	.6	.6
Total	100.0	100.0	100.00	100.00	100.0	100.0

TABLE 8.—*Suggested substitutes for fish meal, meat scrap, dried skim milk, and alfalfa meal*

Ingredient	Substitute for—			
	Fish meal	Meat scrap	Dried skim milk	Alfalfa meal
	Percent	*Percent*	*Percent*	*Percent*
Soybean meal	87.0	75.0	50.0	25.0
Corn gluten meal				25.0
Steamed bonemeal	5.0	13.0		
Dried distillers' solubles [1] or dried whey	6.0	10.0	50.0	50.0
Salt	2.0	2.0		
Total	100.0	100.0	100.0	[2] 100.0
Quantity required to replace 1 pound of fish meal, meat scrap, or dried skim milk and enough ground grain to keep unchanged the total weight of the feed mixture in which the substitution is made [3]	*Pounds* 2.5	*Pounds* 2.0	*Pounds* 2.0	*Pounds* 1.0

[1] Or other fermentation product or byproduct that contains at least 9,000 micrograms of riboflavin per pound.

[2] Starting and growing mashes in which this substitute for alfalfa meal is used should contain at least 0.2 percent of vitamin A and D feeding oil (2,000 International units of vitamin A per gram). Laying and breeding mashes containing this substitute should contain a quantity of such oil equivalent to at least 0.3 percent of the total diet.

[3] Thus, for example, 2.5 pounds of the substitute for fish meal will replace 1 pound of fish meal and 1.5 pounds of ground grain, but 1 pound of the substitute for alfalfa meal will replace only 1 pound of alfalfa meal.

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